

1.0 SCOPE

This specification covers shielded cables rated at 15 kV. These cables may be of discharge free or discharge resistant design. This cable is intended for installation in duct lines, risers, aerial installation (supported by a messenger) or for direct burial. Cables shall be designed to operate continuously at a conductor temperature of 105°C for normal operation, 140°C under emergency conditions and 250°C under short circuit conditions.

2.0 APPLICABLE PUBLICATIONS AND STANDARDS

The cables in this specification shall meet and/or exceed all requirements of the latest editions of the applicable standards listed below. The conductor shall further meet and/or exceed those applicable standards not stated herein but referenced by the below standards.

- 2.1. AEIC CS8 – Specification for Extruded Dielectric Shielded Power Cables Rated 5 through 46 kV
- 2.2. ASTM B3 – Standard Specification for Soft or Annealed Copper Wire
- 2.3. ASTM B8 – Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
- 2.4. ICEA S-93-639 – Standard for 5-46 kV Shielded Power Cable for Use in the Transmission and Distribution of Electric Energy
- 2.5. ICEA S-94-649 – Standard for Concentric Neutral Cables Rated 5 Through 46 kV
- 2.6. ICEA S-97-682 – Standard for Utility Shielded Power Cables Rated 5 through 46 kV
- 2.7. ICEA T-31-610 – Test Method for Conducting Longitudinal Water Penetration Resistance Tests on Blocked Conductors
- 2.8. ICEA T-32-645 – Test Method for Establishing Volume Resistivity Compatibility of Water Blocking Components With Extruded Semiconducting Shield Materials

3.0 PRODUCT REQUIREMENTS

3.1. General Requirements

- 3.1.1. Cables shall be manufactured and tested in compliance with ICEA S-94-649, and the ASTM latest editions.
- 3.1.2. All phases of cable manufacturing and testing shall be accomplished with care and good workmanship.

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3.2. **Conductors**

- 3.2.1. Conductors shall be single conductor, copper, compressed or compact round, concentric lay, class “B” stranding, as specified in Table 1.
- 3.2.2. Conductors may be coated or uncoated annealed, in accordance with ASTM B8 or ASTM B33, as applicable.
- 3.2.3. Conductors shall meet the electrical resistance requirements of ICEA S-94-649.
- 3.2.4. The interstices of the stranded conductor shall be water blocked to reduce the possibility of premature insulation failure caused by water treeing. Further, longitudinal water penetration shall be tested in accordance with ICEA T-31-610.

3.3. **Conductor Shield**

- 3.3.1. Conductor shield shall be an extruded thermosetting semi-conducting or high permittivity polymeric material.
- 3.3.2. The conductor shield shall meet the requirements of the ICEA S-93-639, ICEA S-97-682.
- 3.3.3. The conductor shield thickness shall be in accordance with the latest editions of ICEA S-93-639.
- 3.3.4. The conductor shield shall be easily removed from the conductor and securely bonded to the overlying insulation.

3.4. **Insulation**

- 3.4.1. The insulation shall be a premium quality, heat, moisture, ozone, and corona-resistant tree-retardant cross-linked polyethylene (TRXLPE) or ethylene propylene rubber (EPR) and conform to the requirements of ICEA S-94-649.
- 3.4.2. Cable insulation shall be rated for normal operation at 15 kV.
- 3.4.3. For cables with compressed conductors, the nominal insulation thickness shall be at the 133% level in accordance with AEIC CS8. Cables with compact conductors shall be at the 100% insulation level.

3.5. **Insulation Shield**

- 3.5.1. Insulation shield shall be extruded black semi-conducting polymeric material. Shield shall be clearly marked along its entire length to insure its removal at terminations and joints. Insulation shield diameters and thicknesses shall be in accordance with AEIC CS8 and ICEA S-94-649, respectively.

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3.5.2. The insulation shield shall be applied in a manner to facilitate the removal of all conducting material without externally applied heat. Stripping tensions shall comply with ICEA S-94-649.

3.6. **Concentric Neutral**

Cables with compressed conductors shall have a concentric neutral consisting of #14 AWG solid annealed uncoated copper wires. Compact conductors shall have flat strap concentric neutrals. The concentric neutral shall be helically wound over the insulation shielding with uniform spacing between the wires. The length of the concentric lay shall not be less than 6 times or more than 10 times the diameter over the concentric wires.

3.7. **Jacket**

Jacket shall be an insulating, linear low density black polyethylene (LLDPE) compound. Jacket shall be extruded-to-fill and encapsulate the neutral wires with a maximum thickness per ICEA S-94-649.

3.8. **Identification**

3.8.1. Cables shall be identified in accordance with ICEA S- 94-649.

3.8.2. Jacket to be marked with three longitudinal red stripes spaced 120° apart.

3.8.3. In addition, each phase conductor of a parallel assembly shall be marked A, B, or C for phase identification.

3.8.4. Sequential footage markings are to be applied to the jacket at two foot intervals. Both beginning and tail end footage markings are to be stenciled on the reel flange in addition to being recorded on the reel tag.

3.9. **Test and Inspection**

3.9.1. Cables shall be tested and inspected in accordance with AEIC CS8.

3.9.2. Certificates of Compliance shall be supplied and indicate the cables have successfully passed all tests in accordance with AEIC standards. Certificates shall be included with the packing slips for each reel.

3.10. **Cable Ends**

Cable ends shall be sealed on each individual cable to protect and prevent the entrance of moisture during shipping and storage.

3.11. **Packaging**

3.11.1. **Cable reels**

- a) All reels shall conform to the requirements for class 2 reels as defined in NEMA WC 26.
- b) The maximum flange diameter shall be 96”.
- c) The maximum transverse length shall be 48”.

3.11.2. Cable length shall have a tolerance of -5% / +10%.

3.11.3. Each reel shall be marked with two durable, non-fading labels attached securely to each flange, plainly stating purchase order number, shipping length in feet of cable on reel, type and size of conductor, thickness of insulation, voltage rating, tare weight, DOP Division ID, and beginning and end footage sequence numbers.

3.11.4. Reels shall be upright and securely blocked in position so that they will not shift during transit.

3.12. **Total Weight**

The maximum shipping weight of any reel is not to exceed 14,000 lbs. due to ratings of reel trailers.

Table 1: Schedule of Cables

DIV ID	Conductor			Concentric Neutral	Max. Diameter Over Insulation (in.)	Max. Nominal OD (in.)	Approximate MV-105 Ampacity (A)
	Size	Qty.	Stranding				
50406	2 AWG	1-1/C	Compressed	Full	0.77	1.08	175
50407	2 AWG	3-1/C	Compressed	One-Third	0.77	1.08	175
50408	4/0 AWG	3-1/C	Compressed	One-Third	1.00	1.38	325
50409	500 MCM	3-1/C	Compressed	One-Third	1.29	1.75	500
50410	500 MCM	3-1/C	Compact	One-Third Flat Strap	1.14	1.36	515
50411	750 MCM	1-1/C	Compressed	One-Third	1.48	1.96	600
50412	750 MCM	3-1/C	Compressed	One-Third	1.48	1.96	600
50413	1000 MCM	1-1/C	Compressed	One-Third	1.64	2.18	750